

AF/TFW



PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

May 15, 2007

Applicant: Yoichi SANO

For: METHOD FOR PRODUCING ELECTROLYZED WATER

Serial No.: 10/629 165

Group: 1742

Confirmation No.: 5995

Filed: July 29, 2003

Examiner: Smith

Atty. Docket No.: 3613.P0001US

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**REPLY BRIEF UNDER 37 CFR 41.41**

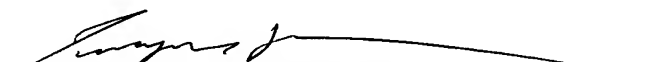
Sir:

This Reply Brief is filed pursuant to the provisions of 37 CFR 41.41 and is directed to arguments made by the Examiner in the Examiner's Answer.

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**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, DC 20231 on May 15, 2007.

  
Terryence F. Chapman

REMARKS

The Examiner states on page 3, last paragraph, that the Shirota et al reference discloses that only the water provided to the cathode chamber is previously softened. To arrive at this conclusion, the Examiner posits that since pure water is used as a make-up water through line 7a' to feed the reservoir 4 in Figure 1-A, the alkaline ionized water discharged from the cathode chamber through line 81 would become softened because, "One skilled in the art knows pure water lacks ions, which by definition would be free of dissolves (sic) salts of magnesium, calcium and iron, thus qualifying as the claimed softened water. Said reservoir would also not contain any dissolved salts of magnesium, calcium or iron, as none are added during the process, so reservoir (sic) would only be filled with softened water."

Appellant strenuously disagrees with the Examiner's hypothesis. Adding pure water to the alkaline ionized water discharged from the cathode chamber will only provide diluted alkaline ionized water. There is no known process of producing softened water by the addition of pure water to any other type of water other than previously softened water. It is to be noted that throughout the prosecution of the present application, the Examiner has provided no support for this proposition other than his opinion. As such, it is readily obvious that the Examiner is in error in his position that Shirota et al shows the feeding of softened water to the cathode chamber.

On page 4 of the Examiner's Answer, the Examiner states that the Yamaguti et al reference teaches a method of producing electrolyzed water wherein the degree of electrolysis can be controlled in order to obtain water with a desired pH and electrical conductivity. However, as pointed out by Appellant in the Appellant's Brief, this reference advocates the regulation of the relative turn-over rate of the cathode anode compartments in combination with the addition of

salt to both sides of the membrane to produce highly alkaline and acidic water at appropriate levels. The control equation as column 8, line 39, is expressed in flow rate and not amps. Currently is only expressed in this reference as a set value of 30 amps at 16 volts, such as at column 7, lines 24-50. Although this reference does state the obvious that the amount of electricity per flow rate of the raw water can be increased by decreasing the flow quantity of the raw water, there is no disclosure in this reference that anything advantageous would be obtained by feeding softened water into a cathode compartment at a flow rate of no more than 40mL/min.

On page 8, first full paragraph of the Examiner's Answer, the Examiner states that the alkaline water 81 would contain sodium ions and since there are no hard cations, and there are sodium ions present in the tank, the water in line 8a will qualify as softened water and thus meet the limitations of the present claims. However, the tap water or well water fed to the anode chamber through line 7a would necessarily contain hardness components such as calcium and magnesium ions. These ions would also transfer over to the anode compartment during the electrolysis process. Since the alkaline ionized water withdrawn from the cathode chamber would necessarily contain hardness components, it cannot qualify as being softened water. The bottom line is that the Shirota et al reference does not disclose the addition of softened water in the electrolysis process disclosed there and there is no disclosure in this reference of a cation exchange resin being used to exchange the calcium, magnesium, and other divalent and higher cations found in ordinary water or sodium ions. As such, softened water is neither added nor manufactured by the process of Shirota et al.

Lastly, the Examiner has stated in the first full paragraph on page 9 of the Examiner's Answer that Appellant has not demonstrated the criticality of the claimed flow rate of softened water to the cathode compartment not being greater than 40mL/min. per ampere of loading current.

First of all, Appellant wishes to point out that the references cited by the Examiner do not speak at all to controlling the flow rate of softened water to the cathode compartment based on the current loading. Example 1 of the present specification showed that a flow rate of approximately 15.4mL/min. per ampere of loading current allowed electrolysis to be conducted continuously for 48 hours without the sticking of scale to the cathode and the generation of a precipitate in the obtained alkaline electrolyzed water. In contrast thereto, Comparative Example 1 increased the flow rate of the water to the cathode compartment to ten times that of Example 1 and, after starting the electrolysis process, the voltage started to elevate with a lapse in time and, after 48 hours, it was impossible to continue the electrolysis due to a high voltage. This illustrates the importance of controlling the flow rate of softened water to the cathode compartment based on the current loading. The references cited by the Examiner do not speak to this parameter.

Comparative Example 2 in the present specification was identical to Example 1 except that unsoftened water was fed to the cathode compartment. As shown by Table 1 in the Appellant's Brief on Appeal, the amount of precipitate in the alkaline electrolyzed water produced in Comparative Example 2 was greater than the amount of precipitate in the alkaline electrolyzed water produced in Example 1. The amount of scale contained in the alkaline electrolyzed water produced in Example 1 was 13 parts per million while that of Comparative Example 2 was 78 parts per million. This establishes the criticality of feeding softened water to the cathode compartment. None of the references of record showed the feeding of softened water to the cathode compartment or speak to the criticality of the two claimed critical parameters of the present invention. That is, the feeding of softened water to the cathode compartment and the feeding of the softened water to the cathode compartment at a flow rate not exceeding 40mL/min. per ampere of loading current. As such, Appellant

respectfully submits that the Examiner has not even presented a showing of prima facie obviousness under 35 USC 103(a) with respect to the presently claimed invention and that the presently claimed invention clearly is patentably distinguishable over the prior art cited by the Examiner.

Reversal of the Examiner is respectfully solicited.

Respectfully submitted,

  
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